

CLEANING SYSTEM FOR AIRCRAFT SKIN

The invention relates to a system for cleaning the skin of aircraft of all types, in particular comprising a scrub head that is carried on a support, for example an arm of a truck-type fork lift.

For technical reasons and to meet statutory requirements, passenger aircraft must be cleaned at regular intervals. At present passenger aircraft used for short hops are cleaned every 45 days and for long trips every 90 days.

A particular disadvantage of the standard cleaning method is that both the cleaning agent and liquid (dirty water) fall to the ground and have to be collected so that the mixture of liquid, cleaning agent, and dirt can be dealt with.

It is therefore an object of the invention to provide a cleaning system that can wash, polish, and dry aircraft of any size and type without leaving cleaning agent, liquid, and the like on the ground. A further object of the invention is to provide a cleaning system that reduces the operating costs standard to date and thus reduces the cleaning costs.

To reduce costs it would be desirable if the aircraft to be cleaned could be cleaned directly on the ramp or anywhere else, without having to move it into a hangar.

These objects are attained in that the cleaning system has a scrub head that has at least one roller, outlets for at least one cleaning agent, inlets for drawing in the cleaning agent, and outlets for steam, a polishing agent, or the like.

5 To best achieve the set goal, it is preferable when there are three rollers provided with bristles, blades, or the like and the rollers are carried on respective (hollow) shafts.

In order to supply the cleaning liquid necessary for scrubbing, it is preferable that the shaft carrying the cleaning
10 roller is provided with the outlets through which the cleaning fluid is pumped.

To suction off the supplied cleaning liquid and dissolved dirt, it is preferable that the shaft carrying the aspirating roller is formed with transverse slots through which the cleaning
15 fluid and dirt are suctioned; in this manner it is possible to suction off the cleaning liquid and dirt.

A particular advantage of the apparatus according to the invention is that the shaft carrying the polishing roller has outlets through which a polishing agent and/or steam are pumped.

20 To rotate the shaft(s), vanes are mounted and an air stream is directed against them to rotate the shaft(s).

In the following the invention is more closely described with reference to an embodiment shown in the drawing, without being limited to this embodiment. Therein:

FIG. 1 is a bottom view of the scrubbing head according to the invention; and

FIG. 2 is a longitudinal section (A-A) through the device in accordance with the invention.

According to FIG. 1 a scrubbing head 1 has three rollers 2, 7, and 13.

The scrubbing roller 2 is provided with bristles and is carried on a hollow shaft 3.

A cleaning liquid (mixture of water and cleaning agent) is fed in through an inlet 4 into the hollow shaft 3 and thus enters the scrubbing head 1. The cleaning fluid exits the hollow shaft 3 through the nozzles 5.

The rotating bristles of the scrubbing roller 2 spread the cleaning fluid exiting from the outlets 5 in the scrubbing head 1 on the aircraft surface; this cleaning fluid loosens the dirt on the aircraft surface.

The scrubbing roller 2 is mounted in a bearing 6.

Like the roller 2, there is an aspirating roller 7 mounted on a hollow shaft 8. This hollow shaft 8 is mounted in a bearing 7'.

The aspirating roller 7 is provided with axially extending plastic blades; these blades move the particle solution on the outer skin of the aircraft being cleaned.

The hollow shaft 8 is formed with transverse slots 9. The dirty water and the particles freed from the aircraft are

sucked in through these slots 9; the dirty water and the particles move through the slots 9 into the hollow shaft 8 and are sucked in the direction of arrow P⁸ along the hollow shaft 8.

Steam and/or a polishing agent are fed in through an intake 10 into the scrubbing head 1. The steam or polishing exits through outlets 11 of a hollow shaft 12. This shaft 12 carries a polishing roller 13. The roller 13 is mounted on bearings 14.

The hollow shafts 3, 8, and 12 carry as is standard vanes (not illustrated) so that they can be rotated by a stream of air directed at these vanes.

Another embodiment is possible where an electric motor in a drive 15 rotates the hollow shafts 3, 8, and 12. A transmission is provided between the electric motor and the hollow shafts 3, 8, and 12.

The hollow shafts 3, 8, and 12 are rotated at different speeds and run in opposite directions. The entire assembly of the scrubbing head 1 with the rollers 2, 7, and 13 on their shafts 3, 8, and 12 is surrounded by a housing 16.

Outside the housing 16 there is a connector block 17 to which are made the connections with the cleaning-fluid input 4, the input 10 for polishing agent and steam, and an outlet 18 through which dirty water and particles are sucked.

FIG. 2 shows how the aspirating roller 7 is mounted inside the housing 16. The aspirating roller 7 is mounted on the hollow shaft 8 that has the transverse slots 9. The hollow shaft 8 is journaled in bearings 7'.

On the upper side of the scrubbing head 1 are fan/motor units 19 and 20. An air passage 21 extends inside and around the housing 16. In order to increase the air-travel speed, the housing inner walls converge generally conically. In order to further
5 increase the speed of the air current, the flow passage 21 is shaped like a nozzle 22 at its outlet. Air is sucked in as shown by P^{19} , $P^{19'}$, P^{20} , and $P^{20'}$, moves along the passage 21 and is expelled at the outlet 22. The annular exiting air stream seals the housing to the aircraft hull.

10 Further modifications are possible according to the invention, for example fewer or more rollers could take over the functions of cleaning and polishing. In addition the locations of the various inputs and outputs for the cleaning agents and dirty
15 water could be moved. As already stated, the way the rollers are driven can be changed, by an electric or pneumatic motor and a transmission.